FILE COPY

Office - Supreme Court, U. S.
FILED
OCT 16 1942
CHARLES ELMORE CROPLEY
CLERK

IN THE

# Supreme Court of the United States

OCTOBER TERM, 1942

No. 71

UNITED CARBON COMPANY and UNITED CARBON COMPANY, INC.,

*Petitioners,*

*vs.*

BINNEY & SMITH COMPANY,

*Respondent.*

## BRIEF FOR RESPONDENT

DEAN S. EDMONDS,
*Attorney for Respondent.*

WILLIAM H. DAVIS,
ROGER T. MCLEAN,
W. PETERS BLANC,
*Of Counsel.*

# INDEX


PAGE

INTRODUCTORY ..... 1

STATEMENT OF FACTS

Carbon Black ..... 2

Efforts of the Art to Solve the Problem..... 5

The Invention of the Patent in Suit..... 10

Introduction of the New Product to the Industry... 17

Petitioners' Pellets ..... 23

ARGUMENT

The Material Characteristics of the Invention..... 24

The Prior Art

Rodman Patents ..... 29

Trent British Patents ..... 30

Geer Patent ..... 31

Knowlton and Hoffman Patent..... 34

Lewis Patent ..... 40

Coffin and Keen Patent..... 41

Summary of the Art..... 51

Invention ..... 52

Infringement ..... 61

Conclusion ..... 65

## Table of Cases

PAGES

*Bernard Joseph Mumm* v. *Jack E. Dacker & Son*, 301 U. S. 168, 171 ..... 51

*Carnegie Steel Co.* v. *Cambria Iron Co.*, 185 U. S. 403, 432 ..... 28, 60

*Cohn* v. *United States Corset Co.*, 93 U. S. 366, 377 ..39, 49

*Consolidated Safety-Valve Co.* v. *Crosby Steam Gauge & Valve Co.*, 113 U. S. 157, 179 ..... 55

*Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84 ..... 55

*Diamond Rubber Co. of N. Y.* v. *Consolidated Rubber Tire Co.*, 220 U. S. 428, 440 ..... 60

*Dubilier Condenser Corp.* v. *New York Coil Co.*, 20 F. (2d) 723, 724-5 ..... 54

*Dunbar* v. *Myers*, 94 U. S. 187, 197 ..... 52

*Expanded Metal Co.* v. *Bradford*, 214 U. S. 366, 381.. 60

*Gandy* v. *Main Belting Co.*, 143 U. S. 589, 594 ..... 60

*General Electric Co.* v. *U. S. Electric Mfg. Co.*, 63 F. (2d) 764-5-7 ..... 60

*Godfrey L. Cabot, Inc.* v. *J. M. Huber Corp.*, 127 F. (2d) 805 at p. 806; 35 F. Supp. 373 at pp. 377, 378, 386 and 387 ..... 22

*Hicks* v. *Kelsey*, 18 Wall. 670, 674 ..... 45

*Hoeltke* v. *C. M. Kemp Mfg. Co.*, 80 F. (2d) 912, 919... 60

*Hotchkiss* v. *Greenwood*, 11 How. 248 ..... 55

*Interstate Circuit, Inc. et al.* v. *United States*, 306 U. S. 208, 226 ..... 50

*Keystone Mfg. Co.* v. *Adams*, 151 U. S. 139, 143 ..... 55

*Krementz* v. *The S. Cottle Co.*, 148 U. S. 556, 560-61..56, 60

*Loom Company* v. *Higgins*, 105 U. S. 580, 594 ..... 50

*Magowan* v. *New York Belting & Packing Co.*, 141 U. S. 332, 343 ..... 55

*McClain* v. *Ortmayer*, 141 U. S. 419 ..... 53

PAGES

*Minerals Separation, Ltd.* v. *Hyde*, 242 U. S. 261, 270-71 29
*Mitchell* v. *Tilghman*, 19 Wall. 287, 391-2 ..... 28
*National Battery Co.* v. *Richardson Co.*, 63 F. (2d) 289, 292 ..... 60
*Paramount Publix Corp.* v. *American Tri-Ergon Corp.*, 294 U. S. 464, 474 ..... 56, 59
*Ruben Condenser Co. et al.* v. *Copeland Refrigeration Corp.*, 85 F. (2d) 537, 541 ..... 60
*Sessions* v. *Romadka*, 145 U. S. 29, 44 ..... 55
*Seymour* v. *Osborne*, 11 Wall. 516, 547 ..... 28
*Smith* v. *Goodyear Dental Vulcanite Co.*, 93 U. S. 486, 495 ..... 60
*The Barbed Wire Patent Case*, 143 U. S. 275, 282-3 ... 60
*The Corn-Planter Patent*, 23 Wall. 181, 225-6 ..... 28

TEXT BOOKS

*Corpus Juris, Patents*, Substitution of Materials, pp. 73, 74 ..... 45
*Robinson on Patents*, Vol. I, pp. 132-33 ..... 25
*Robinson on Patents*, Vol. I, viii ..... 52

IN THE

# Supreme Court of the United States

OCTOBER TERM, 1942

No. 71

UNITED CARBON COMPANY and UNITED CARBON COMPANY, INC.,

*Petitioners,*

*vs.*

BINNEY & SMITH COMPANY,

*Respondent.*

## BRIEF FOR RESPONDENT

### Introductory

This is a suit for infringement of Wiegand & Venuto patent No. 1,889,429 granted November 29, 1932, and owned by respondent. The patent describes and claims a product and a method of making that product. The petitioners are charged with infringement by reason of their manufacture and sale of the patented product, and the charge of infringement is, therefore, based upon product claims Nos. 1 and 2 of the patent. The method used by petitioners in the production of their product is different from that described in detail in the patent, and is not within the terms of the method claims of the patent, so those method claims are not here in suit.

In the District Court the patent was held invalid for lack of novelty and lack of invention and on the further

ground that the claims in suit insufficiently define the invention (R. 1-4). On appeal, the Court of Appeals for the Fourth Circuit reversed the District Court's decision, holding the patent valid and infringed and rejecting the suggestion of indefiniteness (R. 462-71).

## STATEMENT OF FACTS

### Carbon Black

The Weigand patent in suit relates to a finely divided pigment known as "carbon black," sometimes referred to as "channel-black." It is the same sort of product as lamp-black. In its natural state it is a light fluffy material, its outstanding characteristic being the fine state of subdivision in which it exists (R. 6). The individual particles are so small that they cannot be seen with a microscope (R. 14). Only in recent years has it been possible to ascertain their size by reason of the development of what is known as the electron microscope. By employing that instrument it has been ascertained recently that the carbon black particle is about one millionth of an inch in diameter (R. 14). The particle size is far less than that of any other pulverulent material known. As an indication of their small size, the particles in a pound of carbon black have a surface area of 13 acres (R. 15).

Carbon black is produced by burning natural-gas under a restricted supply of air with the result that unconsumed carbon in the flames is deposited upon metal surfaces. This carbon deposit is then scraped off and accumulated in the form of light rolls (R. 7). Its minute particle size makes carbon black invaluable for a variety of uses, including use as a pigment in making inks, paints and polishes, and as the coating material for carbon paper.

But the great use of carbon black, the use which consumes about four-fifths of the total amount produced, is in the manufacture of articles from rubber, particularly automobile tires, and it is that use with which we are specially concerned in this suit.

Use of black carbon pigments in making inks began some thousands of years ago. Over sixty years ago, carbon black produced from natural-gas started to replace lamp-black and other black carbon pigments for this and similar purposes and since then the general use of carbon black has steadily increased (R. 6). The great impetus to the use of carbon black, however, came along about 1912 when it was discovered that carbon black is of inestimable value in rubber manufacture (R. 8-9). It is that use which gave birth to the invention of the patent in suit and it is in that field of industry that the invention filled a long-felt want and brought about a change of conditions and procedure of such consequence that it has since been adopted and used by a large part of the rubber industry.

In making articles of rubber, automobile tires among others, it is common to incorporate in the rubber a finely divided substance generally referred to as a reinforcing agent. About 1912, the reinforcing agent commonly employed was zinc oxide and the tires of that day ran from 3,000 to 5,000 miles. At about that time it became the accepted practice to use cords instead of fabric in the carcass of the tire, and that strengthened the carcass greatly. But a substantial increase in tire mileage could not be obtained by increasing the strength of the carcass unless the rubber tread applied to the carcass were correspondingly improved. That improvement in the strength and toughness of the rubber tread developed about the same time through the discovery that carbon black in rubber is a vastly better reinforcing agent than zinc oxide. Pri-

marily by reason of these two advances in tire manufacture, the automobile tire was improved to what we now have, a tire whose mileage is 20,000 miles or more (R. 8-10).

By 1915 the use of carbon black in rubber articles, particularly tires, had gotten under way to a considerable extent and from ther on it grew steadily, running up into the millions of pounds per year and now amounting to about four hundred millions of pounds per year (R. 10, 63).

However, the fine particle size of carbon black which made the black so invaluable in rubber manufacture was responsible for another condition. In making rubber articles, the ingredients employed, rubber, sulphur, accelerator, reinforcing agent, etc., are intimately mixed together by passing them between large, heavy, power-driven rollers a great many times, in a machine known as a rubber mill (R. 18, 63-64). With carbon black as the reinforcing agent, the black was incorporated in the mixture by pouring it upon the rubber as the latter is being passed between the rollers of the mill (R. 63). When that was done it was impossible to avoid dispersion of the fine light particles of the black into the air about the mill. The slightest movement of the air around the batch of carbon black caused the black to pass into the air in a cloud. It went everywhere. It permeated everything. It blackened the faces and hands of the operators. It went into their nostrils, mouths and lungs. It went into other stocks of rubber where it was not wanted. It discolored everything and everybody. It was generally thought that it created a hazard of fire and explosion. In fact it was almost intolerable from every standpoint of health and working conditions (R. 11-12, 63-65). But the black was so valuable in the improvement of the quality of the rubber that it had to be used and was used, even though the conditions of its use were abominable.

Under those conditions it was inevitable that from 1915 on a great effort would be made to cope with this dust problem and that skilled men in the rubber and carbon black industries would apply their talents to devising some expedient for eliminating or suppressing the dustiness of carbon black. That is what occurred. For a period of twelve years a succession of proposals were advanced, patented, tested by the industry, and found useless or unsatisfactory. At the end of 1927, when application for the patent in suit was filed, the problem still remained unsolved and industry, in spite of its efforts, had not yet achieved freedom from carbon dust.

## Efforts of the Art to Solve the Problem

The initial effort of the rubber and carbon black industries was to attack the problem at its source by devising some expedient for reducing the dustiness of the carbon black itself.

Carbon black as produced in the "burning house" is a loose, light, fluffy product weighing about three pounds to the cubic foot. Impractical to handle in such bulk, it was the customary procedure to remove part of the air by agitation, thereby producing a partially de-aerated product weighing about twelve pounds to the cubic foot. In this state it was put into paper bags of twelve and a half pounds capacity and shipped. It was material in this form which presented the initial dust problem to the rubber industry (R. 7-8).

The first effort to solve the dust problem was by subjecting the carbon black in its paper container to strongly applied compression which compacted the bag down to a flat package and expelled more of the air from the product.

It was found that although this "single pressed" product helped a little, the dust was in almost as great volume as before, so a further stage of compression was introduced whereby the bag was squeezed down in the opposite direction (R. 15). The "heavy compressed" black was found to be somewhat less dusty than the single pressed black but only in a very minor degree (R. 46). One reason for this was that under pressure the paper bag crimped down and the black was squeezed into the folds. When the bag was opened at the rubber plant and the carbon black shaken out onto the rubber passing through the mill rolls, the very dust which the compression sought to eliminate was shaken out into the atmosphere of the mill room (R. 16-17). An effort to compress the black even further was made and a patent taken out but this resulted in failure since it compacted the black to such an extent that it failed to disperse thoroughly through the rubber (R. 16). Thus, pressure proved to be a palliative and not a cure. The dust was bad and continued to be bad though to a somewhat less extent (R. 17). The condition was so serious, however, that even a palliative was welcome and the compressed black was largely used by the rubber industry throughout the decade of 1920 to 1930 (R. 17). This was the only direct attempt to solve the dust problem that achieved any measure of acceptance prior to the invention of the patent in suit.

Further efforts were made, however, to eliminate the dustiness of the black by both the carbon black industry and the rubber industry. These proposals took one or another of two forms. The first was to introduce into the black some sort of agglutinant or binder which would hold the particles together and prevent them from dispersing as dust. Among the binders tried out were waxes, hydrocarbon oils, linseed oil, paraffin, tar, starch, sugar and glue. The product of these processes took the form of

curds, pastes, ribbons, or masses of black in a granular or lumpy condition ranging in size from powder to walnut-sized lumps.* Experimentation in this direction was soon abandoned, however, for the rubber industry rejected any form of carbon black containing a binder. The reason for this rejection was that the binder exerted a deleterious effect upon the rubber. In the case of solid binders it was found that the particles of black were bonded so strongly together by the binder that they would not disperse freely in the rubber (R. 200). In the case of liquid binders, it was found that for such a binder to be effective in holding the carbon particles together adequately it had to be used in an amount that could not be tolerated in the final rubber compound since it would weaken the tire (R. 200-201). As a consequence, the use of binders in carbon black for rubber manufacture never got beyond sufficient experimentation to demonstrate that procedure along that line held out no promise (R. 14, 15, 28-9, 65, 200-201).

The second group of proposals involved mixing the black with water, alcohol, kerosene or other volatile liquid and then permitting the liquid to evaporate, leaving a solid dry mass in cake form or in a granular or lumpy condition, like mud which has dried out in the sun.** This product was also rejected by the rubber industry as useless for mixing with rubber because in the course of evaporating the volatile wetting agent from the black a lumping of the

---

* Patents disclosing the use of such binders relied on by petitioners as prior art are: Lewis (R. 281); Randall (R. 283); Acheson (R. 285); Knowlton & Hoffman (R. 287); Geer (R. 289).

** Patents disclosing this procedure relied on by petitioners as prior art are Lewis (R. 281); Knowlton & Hoffman (R. 287).

material occurred which was relatively quite hard or harsh and would not disperse through the rubber and give a full reinforcing effect (R. 13-14, 214-16). Furthermore this "mud cake" had a tendency to break down at the edges when handled with the result that in the course of transportation when in lump form, or in the course of being broken up preliminary to going on the rolls when in cake form, the material returned to its original dusty state in substantial part, restoring the dust problem (R. 214-16). For these reasons these proposals were as ineffective as the attempts to use binders and never went beyond the stage of experimentation which disclosed their deficiencies (R. 15, 216).

In view of the inability of the art to eliminate the dustiness of carbon black, the rubber manufacturers were driven to accept the dust nuisance as unavoidable and do what they could to segregate the area affected. Dust collectors operated by suction were installed, and separate rooms were put up where nothing was done but mix the black with the rubber. In one case a million dollars were spent to build a rubber mixing plant detached from the rest of the plant solely to segregate the black and thus reduce the area affected by the dust nuisance (R. 13, 65). Towards the end of the nineteen-twenties, inclosed mixing devices such as the Banbury mixer began to be used in place of open mixing rolls, but these merely ameliorated the condition and could not cure it since clouds of dust escaped from the machines, and installation of expensive dust collecting devices continued in the effort to afford some measure of protection to the workers (R. 69, 70, 72).

And so the "era of dust" continued from 1915 to 1930 (R. 13) and the rubber industry went on year after year using carbon black in enormous quantities in rubber manufacture because there was no other known way of making

rubber articles of the same high quality, but also with the operation plagued by this mill-room condition growing out of the flying of the carbon black particles and depositing of the particles on everything and everybody (R. 150-151).

There is no disagreement here as to the existence of this condition of dustiness throughout the years from 1915 to 1930, the recognition of it by all concerned, the effort of many people to provide a remedy, and the failure of every proposal that appeared (R. 150-151). In this record there are patents issued from time to time during those fifteen years, and magazine articles and Government publications, all of which testify to the seriousness of the dust problem incident to the use of carbon black in rubber manufacture. Many of them refer to the danger to the health of the employees working in such a dust-laden atmosphere. Others refer to the danger of fire or explosion. Still others refer to the discoloration of rubber stocks for use in making rubber articles of colors other than black. We append below* a classification of such publications commented upon or appearing in the record before the Court. (See R. 24-29.)

---

* Patents describing the objectionable dustiness of carbon black as made: 1,245,700; 1,263,082; 1,286,024; 1,405-439; Re. 21,379; Brit. 127,770; 1,384,089; 1,541,233; 2,120,-540; Re. 19,750; 2,039,766; Re. 21,390; 2,127,137.

Patent referring to the explosive nature of carbon black, 1,651,733.

Patents referring to discoloration of rubber stock by carbon black dust in the atmosphere: 1,405,439; 1,384,089; 1,541,233; Re. 19,750; 2,039,766; 2,127,137.

Patents commenting on loss of product due to dusting: 1,245,700; 1,263,082; 1,286,024; Re. 21,379.

Patents referring to the detrimental effect of carbon black in the atmosphere on the health of employees: 1,245,-700; 1,286,024; 1,651,733; Re. 21,379; 1,263,082; Re. 19,750; 2,039,766; 2,127,137.

Such are the facts of the situation in which the invention of the patent in suit appeared.

## The Invention of the Patent in Suit

The invention of the patent here in suit provided a solution for this long-existing dust problem.

At the date of the invention the rubber industry had increased its use of carbon black to the point of adding 50% of black on the rubber and carbon black makers were under continual pressure to eliminate the dust nuisance, the more so because the rubber industry had put forward its best efforts and had failed in all its attempts. Carbon-black had come to be "the most respected and the least loved pigment in the whole rubber industry" (R. 218).

In attacking the dust problem, at the outset of their researches the inventors of the patent in suit turned their backs upon the use of binders, since these had been demonstrated to be thoroughly unsatisfactory. It seemed to them that wetting down the black with water and allowing the water to evaporate was the neatest and cheapest way of eliminating the flying particles. Consequently, in spite of the previous failures along this line, they embarked on an investigation of the possibilities of evaporating a volatile liquid from a mixture of the liquid and carbon black particles. They tried all the expedients in this category which had been proposed theretofore until they convinced themselves that those procedures only led up a blind alley as far as solving the dust problem was concerned. But in the course of that long investigation, they learned other things which were distinctly helpful and which they utilized to direct their further efforts. They ascertained that while the evaporation of the liquid from the black is going

on, many things happen in the mass which they had not suspected. The powder not only settles but is drawn together by surface tension forces. The whole mass contracts slowly and the particles nest within each other and stick together, and millions of little vortices occur, and little centrifugal movements which produce a further sticking together of the particles. It was this phenomenon that caused the lumping and harshness of the products developed by the prior patentees who had followed this same line of approach (R. 218-19).

These newly developed items of information are set forth by the patentees in their patent in full (R. 228, 1/20-52).* Having referred to the objectionable dustiness of black, the patentees say:

> "Numerous attempts have been made to overcome these objectionable properties of carbon black and render it denser and less dusty, but all such attempts heretofore have greatly changed the very essential physical properties of the carbon black which make it industrially valuable. Thus, the carbon black may be made into a paste with water or other volatile liquid such as gasoline, solvent naphtha, xylene, turpentine, carbon tetrachloride and the like, and the volatile liquid then distilled or evaporated, but the resulting cake is hard, the carbon particles tend to hold together in chunks, and they no longer disperse readily and uniformly as for example in rubber compositions. Apparently the state of aggregation of the carbon particles has been changed in such altered carbon blacks, and, as a matter of fact, the industrially essential physical properties, namely, easy and uniform dispersion, are so much impaired that such processes have never been a commercial success.

---

* Patents referred to in the text will be cited as 1/20-52, *i. e.*, page 1, lines 20 to 52.

> "We find that when the original carbon black is added to a liquid to form a paste and the liquid slowly distilled or evaporated, such treatment causes changes which are associated with a free meniscus, i. e. vortices, surface tension adhesion, settling, volume contraction of the black, and a very persistent adhesion of particle to particle. The result is the clumping together of the carbon and the loss of dispersibility, as referred to above."

The patentees sought to make use of this knowledge they had acquired in their further efforts. They conceived the idea that the occurrence of these phenomena might be prevented by stirring the mixture throughout the course of evaporation, and allowing the water to evaporate from all directions at once instead of solely from the upper surface of the paste or slurry. Experimentation along this line disclosed that these expedients effectually prevented the contraction phenomena and produced a soft and dispersible material, but they restored the dust problem. The material produced was soft and dusty. It was essentially caked and on the slightest handling would break down again into powder (R. 218-19).

With these results in mind, the inventors, after about a year's work, hit upon the idea of ridding the wetted mass of carbon black of water, not by evaporation, but by driving it out with a much smaller quantity of an organic liquid such as gasoline which could then be volatilized, leaving the carbon black in a final state of purity (R. 219). To effect the driving out of the large quantity of water and its replacement by a minimum amount of gasoline, the mixture was subjected to a violent agitation such as had not been previously employed by them or by any one else, an agitation which tumbled and beat up the material under treatment. In the course of this experimentation and as a direct result of the violent agitation, they made a momentous discovery. On opening the container in which

the wetted mass of carbon black had been subjected to violent agitation, they perceived that the black existed in the form of a multitude of small round pellets, a condition which was totally unexpected. The pellets, thus exposed to view for the first time, were wet, but they were wet with gasoline, the water of the original mass having been displaced from the pellets by the gasoline. This water was then drawn off by decantation and the pellets dried by subjecting them to mild heat to drive off the gasoline by volatilization. The resulting product was the product of the patent here in suit, namely, pure carbon black in the form of small pellets, round, having a smooth surface and a porous interior, and with the individual particles of each pellet bonded together with a strength sufficient to maintain the pellet form throughout all usual handling operations. It remained to be determined whether these pellets would break down under pressure into the multitude of individual particles of which each pellet was formed, and whether the process of pellet formation could be so controlled as to produce the pellets in the size and friability which would result in complete breakdown and consequent complete dispersion in rubber. This required much further research but was ultimately accomplished, resulting in the production of pellets which, while of a structural strength adequate to resist breakage in all usual handling operations, would, by reason of their porosity and consequent friability, break down under the pressure applied in the rubber mill into the individual particles so thoroughly that dispersion in the rubber is no less than that attained with the unpelleted flocculent black as originally produced.

The long research of the patentees leading ultimately to the discovery we have stated above and the key position of that discovery in the series of developments leading to this solution of the dust problem were the subject of

comment by one of the inventor-patentees, Mr. Wiegand, beginning just below the middle of page 217 of the record and extending over on page 220. We commend this testimony particularly to the Court's attention as we think it is more enlightening on the issues before the Court than any other testimony in the record.

The patent describes quite fully the process by which the new pelleted carbon black product is made. Thus it is stated (R. 229, 2/15-27):

> "The carbon black is first mixed with water so as to form a comparatively thin paste with most of the occluded gases driven out. After thorough mixing gasoline is added and the whole mass thoroughly agitated. As a result substantially all of the carbon black floats on top of the water in the form of pellets and may be readily removed by filtering, decanting or the like. These pellets may then be dried to remove the absorbed gasoline and such moisture as there may be contained therein."

The type of agitation is described as follows (R. 230, 3/114-4/5):

> "For batch operation the agitation may be accomplished by violent shaking, rotating or tumbling of the container, and for continuous operation the agitation may be by any means which will impart rapid changes in the direction and/or velocity of the flow of the mixture stream, as for instance, appertured obstructions or baffles in a conduit."*

The phenomenon of pellet formation is specifically described in the patent (R. 229, 2/34-43):

---

* The process is further described in the patent (2/42-75; 2/116-3/71) with its variants (3/72-3/123). The agitation is repeatedly referred to (1/55, 2/8, 2/18-20, 2/34-41, 2/74-79, 3/28, 3/59-61). No further analysis of the process need here be made since petitioners use a process which is not within the terms of the process claims of the patent.

"On the first addition of gasoline to the black and water paste, with agitation, the mass seems to thicken like an emulsion; then on further shaking, it seems to flocculate into granules; as the agitation goes on, a slight creaming to the top of the pellets or a scum takes place, then gradually the pellets form and float to the top. The end point is reached when the water below is free of carbon-clear."

The aggregates of pure carbon black which floated to the top of the slurry were the unexpected and welcome product of this operation. After being dried to evaporate the gasoline, they were pellets of pure carbon, and, being round and smooth, would flow from hand to hand without dusting. At first their hardness raised a question in the inventors' minds as to whether these little resistant things could actually be restored into carbon black in its finely divided state by the normal procedure in a rubber mill (R. 75, 219-20). But further investigation dispelled that doubt and disclosed the full possibilities of the new product. The capacities and performance of the aggregate are set forth in the patent (R. 228, 1/81-90, 2/106-116):

"This process, if carried out under certain conditions, causes the carbon black to form into pellets which are hard enough to stand any ordinary shipment or handling without dusting, flying or breaking down, and which at the same time are easily crushed by moderate pressure, as between the fingers or by the pressures commonly employed in the rolls of rubber compounding machinery, printers ink mixers and the like. The crushed particles have substantially their original softness and the material disperses freely without leaving any particles of undispersed carbon in the material."

* * * * * *

"The pellets will not pack down in the bottom of a bag or other shipping container as is the case

with untreated black and may be stored in bins and delivered through chutes to the point of use, without caking or sticking. The non-flying properties permit better control of the mixing in rubber or other composition, facilitate weighing, result in a substantial saving of material by eliminating mechanical loss, and add to the comfort of the operator."

The physical characteristics of the product which distinguish it from what had gone before and which constitute the means whereby the performance just outlined is obtained are set forth in the specification of the patent as follows (R. 229, 2/80-93):

> "The pellets are very porous, of substantially spherical or globular form, have a smooth somewhat lustrous outer surface which is not easily broken by handling, are more compact than untreated carbon, are fragile under light pressure, and may be easily reduced to soft minute particles which cannot be told from the original particles except that possibly they have a more unctuous feel. They somewhat resemble lead shot and may be rolled in the hand without dirtying or dusting. Apparently the outer surface portion or shell of each pellet is slightly more compact than the inner part, but still porous."

With regard to the density of the pellets the patent states (R. 229, 2/94-98):

> "In shipping or storing, we find that approximately twice the number of pounds of these pellets can be placed in a container of a given size than is the case with the untreated carbon black."

The salient physical characteristics of the new manufacture are thus the purity of the carbon aggregate from which any form of binder or agglutinant is excluded (R. 189-190), the rounded shape and smooth surface which not

only permit the aggregate to flow, but which permit it to flow without breaking corners and recreating dust as would be the case were the black in sharp-edged granular form (R. 19, 49), and the porous interior of the aggregate which is the prerequisite to the ease and completeness with which it breaks down and disperses in the rubber mix when pressed by the rolls (R. 83).

The claims in suit, which are based upon this combination of novel characteristics, read as follows (R. 231, 4/8-16):

> "1. Substantially pure carbon black in the form of commercially uniform, comparatively small, rounded, smooth aggregates having a spongy or porous interior." *
>
> "2. As an article of manufacture, a pellet of approximately one-sixteenth of an inch in diameter and formed of a porous mass of substantially pure carbon black."

Thus, the patentees provided a new product, different physically from anything that existed before, and distinguishable from everything that preceded it in that it consists of pellets of pure carbon, hard enough to withstand handling, having an interior so porous that they break down readily for complete dispersion of the component particles, and having smooth, rounded surfaces so that they are fluent.

### Introduction of the New Product to the Industry

The new, pelleted, pure-carbon product and the two-liquid process of making it were invented in 1927 and the

---

* The words "porous" and "spongy" are synonymous for all intents and purposes, the word "spongy" referring to the capacity of a porous material to suck up water (R. 89).

application for the patent in suit was filed December 2, 1927. Through the next two years there was vigorous and continuous work in development of the process of manufacture for the production of the product in the best form and under suitable control and at low cost. Coincident with this was submission of samples of the new product to users of carbon black in rubber manufacture to acquaint them with it and overcome the resistance to changing from an established practice to a new and different one, and also to overcome the fixed belief of the rubber manufacturers, based on their previous efforts to solve the dust problem, that an agglomerated carbon product could not be incorporated in rubber successfully (R. 30-32, 75, 220).

In 1928, only sample lots were sent out to users, but in 1929 factory-size test orders were shipped to the extent of 20,000 pounds of pellets. Sales octupled in 1930 to 164,000 pounds, grew to 194,000 pounds in 1931 and reached 281,000 pounds in 1932 (R. 32).

In 1932 a considerable resistance to the commercialization of the product was removed. The cost of producing the pellets by means of the two-liquid process disclosed in the patent in suit was high as it involved the use of high-grade gasoline such as aviation gasoline in which there is a minimum amount of high boiling constituents (R. 29-30; 230, 3/29-33). Consequently a premium of three-quarters of a cent to one cent a pound was charged for the pellet form of black and this increased price encountered great resistance in those depression years (R. 32, 51). In 1932, Mr. Herman Glaxner, the respondent's engineer in charge of its two-liquid pelleting plant, moved by these circumstances, and moved even more forcibly by the fact that the constant presence of gasoline vapor in the air at the plant rendered him ill, began investigating the possibility of eliminating the gasoline from the process. His researches

developed the fact that pellet formation is not entirely dependent upon the selective wetting power of the gasoline (patent in suit, R. 230, 3/97-100), and that if the type of tumbling or impact agitation disclosed by Wiegand and Venuto were retained and properly adjusted to the new conditions, pellets could be formed by a process in which the black was mixed solely with a small quantity of water (R. 199). This so-called "single-liquid" process developed by Glaxner was patented by him (R. 264) and was put into use promptly in substitution for the "two-liquid" process of Wiegand and Venuto. It was an improvement of much consequence because it effected a reduction in the cost of producing the pellets by reason of not requiring the use of expensive aviation gasoline. The product of this changed procedure, however, was identically the same as that produced by the "two-liquid" process of the patent in suit during the preceding three years (R. 20, 22, 42, 43, 49, 54, 59, 187, 191, 199) but the lowered cost of production led to the use of the "single-liquid" process by respondent's supplier in preference to the "two-liquid" process ever since (R. 199). Thus, although the Glaxner process is an improvement over the Wiegand and Venuto process, it is its direct lineal descendant since for the formation of pellets it depends on the expedient first disclosed by the patent in suit, namely, a severe agitation or beating action which forms the black into pellets in consequence of repeated blows and impacts (Glaxner patent, R. 264, p. 3, col. 1, l. 42 to col. 2, l. 15).

With the use of the less expensive single-liquid process beginning in 1932, the price of the pellets was reduced to that of the unpelleted carbon black. Sales of the product steadily increased and in a comparatively short time reached huge proportions, advancing from 800,000 pounds in 1933 to 97,000,000 pounds in 1939. In 1940, over 93% of

respondent's total deliveries of carbon black to rubber manufacturers was in the pellet form (R. 32-33). Petitioners' sales of the infringing product, tabulated at page 185 of the record, tell the same story.

The widespread use of the new manufacture led to the introduction of new methods and apparatus for handling the black in transportation and distribution in accordance with the suggestion in the patent (R. 229, 2/108-111). This resulted in further economies. The new system of handling was rendered possible by the fluent property possessed by the new product in consequence of its rounded form and smooth surface already commented upon (*supra*, p. 16-17). The former practice of handling the black in paper bags was supplanted by new procedures in which the product was handled in bulk, allowing it to flow by gravity or elevating it by power-driven mechanical devices. Instead of packaging the carbon black in bags and piling the bags in freight cars, the fluent property of the new pelleted black permitted of shipping the product in bulk in closed tank-cars into which the carbon black pellets were allowed to flow by gravity at the plant of the carbon black manufacturer, and, at the plant of the user, they were allowed to flow by gravity into power-driven screw conveyors which carried the product to an elevated storage bin for distribution therefrom by gravity (R. 33-34). This procedure, plus the intrinsic non-dusting property of the new product, brought to the workers employed in mixing rubber a cleanliness and comfort in striking contrast to the abominable conditions which had prevailed for so many years prior to the invention (R. 33-34, 67).

A further reaction to the appearance of the invention of the patent in suit was a burst of activity among inventors in the art. This activity took the form of further

development of processes and products useful in the new field opened up by Wiegand and Venuto (R. 37-41). Some of the patents which issued on applications filed during the decade following the introduction of the new product have been collected as plaintiff's Exhibit No. 1 and may be found at pages 235-279 of the record, and comment on them appears at pages 37-41 of the record. As is pointed out in the testimony on those pages, the specifications of these later patents contain many references to the seriousness of the dust problem throughout the many years of its existence, how perfectly the smooth round porous pellets of pure carbon black solved that problem, how completely the particles of such pellets became dispersed in rubber, and how well adapted the pellets are for economic handling in bulk, using closed tank cars, gravity-feed apparatus, and power-driven screw-conveyors.*

Comment of like purport appeared in publications other than patents in the years following the introduction of the new product; included among them is an article in a trade magazine of the rubber industry written by the man who testified at the trial as an expert in behalf of petitioners

---

* Significant portions of those of the many patents in this category which are in the record before the Court are as follows:

No. 2,120,540, R. 235, col. 1, l. 1-10; 48-54, col. 2, l. 3-31; 236, col. 2, l. 49-58.

No. 2,120,541, R. 241, col. 1, l. 18-37.

Re. No. 19,750, R. 248, col. 1, l. 6-16, 22-37; col. 2, l. 15-23, 48-55; 249, col. 1, l. 1-9.

No. 2,039,766, R. 258, col. 1, l. 6-16.

Re. 21,390, R. 268, col. 1, l. 1-17.

No. 2,127,137, R. 271, col. 1, l. 14-24; 272, col. 1, l. 11-24; col. 2, l. 3-15.

No. 2,131,686, R. 276, col. 1, l. 5-44.

(R. 279 and 165-6). Also, the use of the new, pelleted, carbon black product is the subject of comment in annual publications of the Bureau of Mines of the Department of the Interior wherein the product is referred to as "dustless," and the rapid increase in the amount used by the rubber industry is noted, and an early one of these publications prognosticated that the new product would "revolutionize transportation methods" which is just what did happen in the course of a very few years (R. 451 and 34 to 36).

Three of the patents referred to above as of later date than the patent in suit have been before certain of the lower Courts in recent years and were sustained as valid though limited in scope by reason of having been granted for later subsidiary improvements. The opinions of the Courts in the litigation referred to include comment on the dust problem, the long period of years during which it existed, the numerous efforts of competent men to solve it, the failure of all such efforts up to the time when the invention described in the patent in suit appeared, the entire sufficiency of the new product as a solution for that problem, and the rapid growth of its use following immediately upon its introduction. The Court of Appeals of the Fifth Circuit in the case referred to said that the new pelleted carbon black product "has many commercial advantages and there is no question of the usefulness of the product and its recent novelty" (*Godfrey L. Cabot, Inc.* v. *J. M. Huber Corp.*, 127 F. (2d) 805 at p. 806, and 35 F. Supp. 373 at pp. 377, 378, 386 and 387).

Two of the patents in the litigation referred to were issued to a Mr. Billings who testified in this suit in behalf of petitioners. Practically the whole of the factual side of respondent's proofs on the issue of invention in this case is

established, briefly but comprehensively, in the cross examination of Mr. Billings (R. 150-151).

In the circumstances as we have thus outlined them, it will appear that there is no exaggeration in the affirmation of Mr. Billings that "the introduction of pelleted carbon black into the business of supplying the rubber manufacturing industry effected what one might call an industrial revolution" (R. 150).

## Petitioners' Pellets

Petitioners sell carbon black in aggregates having all the physical characteristics of the pellets disclosed and claimed in the patent in suit. A sample is in evidence as Exhibit 20. On comparison with respondent's products as shown by Exhibits 11, 15, 22, there appears to be no difference between them and no difference of any consequence is asserted.

Petitioners make aggregated carbon black products by several different procedures. In this suit the charge of infringement is based upon the product of petitioners' plant at Sayre, Oklahoma, described at length by petitioners' chief engineer (R. 98-106). The manufacturing procedure used at that plant is the "single liquid" method described above (*supra*, p. 18-19), the procedure which respondent originated in 1931 and which respondent's supplier has been using continuously since the beginning of 1932 (R. 56 and 199). That method of manufacture used by both petitioners and respondent's supplier, while it is dependent upon violent agitation of the wetted mass of carbon black as described in the patent in suit, is not within the terms of the method claims of the patent because of unnecessary limitations stated therein, but the pelleted product is that

described and claimed in the patent and could hardly be otherwise since it appears to be identical with respondent's product and is made by the same procedure and is purchased by the rubber companies as fulfilling their exacting requirements just as is the product of respondent. More specifically, petitioners' product consists of pellets of carbon black which are substantially pure by reason of containing no binder, which are of uniform size and rounded in shape and smooth of surface with the result that they have the property of fluency, and which have the porous or spongy interior of the patented product from which is derived the important ability to disperse readily and thoroughly in a rubber batch (R. 73).

## ARGUMENT

### The Material Characteristics of the Invention

In evaluating the invention in the light of the prior art it is essential to recognize the material characteristics of the invention by which it is to be distinguished from what went before and which define the monopoly claimed by Wiegand and Venuto. Petitioners have injected considerable obscurity into this issue, so it is necessary to establish the facts clearly before proceeding with a detailed discussion of the prior art patents on which they rely.

At critical points in their brief petitioners define the product claimed in the patent in suit as constituting simply an aggregation of pure carbon black particles strong enough to hold together yet capable of disintegrating into the original particles when milled into rubber (Brief, p. 9, 10-11), and allege that this was the view of the Court below (Brief, p. 44-45, 51).

This is an entirely inadequate definition of the invention and does not correspond to the claims. As we have

pointed out, the material characteristics of the invention are the purity of the aggregate, its rounded shape, smooth surface, and porous interior. These are the essential characteristics of the aggregate stated in the claims, the means whereby the desired performance is obtained, and the claims were so understood by the Court below. Speaking of the claims, the Court said (R. 469):

> "They describe the product, not in terms of function as defendants contend, but in terms of size, content, shape and texture. The pellets are described as small aggregates composed of substantially pure carbon black, as being rounded and smooth in shape, and as having a spongy, porous interior. We think that this describes them as accurately as they can be described."

The same characteristics were considered by the Court below in finding infringement by petitioners' pellets (R. 470) and it was of such a product that the Court said with reference to the prior patents relied on here (R. 468):

> "None of these patents discloses any such product as is covered by the patent sued on."

The definition of the invention advanced by petitioners not only fails to define the patented invention, but fails to define an invention at all and is simply a statement of the results obtained. It is plain that in every effort to solve the dust problem directly, the first thought was to aggregate or anchor the particles together so as to prevent them from flying into the atmosphere. The second thought, equally obvious, was that since it was essential that the particles disperse freely through the rubber mix, some means had to be provided whereby the particles, once hooked together, would be set free under comparatively light pressures. These were the ends or objectives which every inventor who attempted the problem had in mind.

There is, of course, no patentability in such ideas of end; an invention resides solely in the *means* whereby such ends are attained (*Robinson on Patents,* Vol. I, p. 132-33).

The means proposed by the prior art to achieve these ends were various, one of the first being the provision of a liquid such as water or kerosene which would bind the particles lightly together and prevent flying of the particles when the moist aggregates were introduced into the rubber mix (Geer, *infra,* p. 31-34). A variation of the binder means was the use of a sticky substance, such as glue or starch which when dried would lock the particles together so lightly that the pressure of the mill rolls would suffice to free them again (Knowlton and Hoffman, *infra,* p. 34-40). Although this expedient both aggregated the particles and permitted their ultimate dispersion, it proved useless since the presence of the binding agent damaged the rubber and binders which were solid were apt to prevent dispersion (*supra,* p. 7). Another proposal involved binding the particles together with a large quantity of volatile liquid such as water and then allowing the liquid to evaporate. In the course of evaporation the particles contracted and locked together by reason of surface tension, vortex action, and the like (Knowlton and Hoffman, *infra,* p. 34-40). This expedient succeeded in locking the particles together so that they would not fly, although handling broke the material and recreated a substantial amount of dust. It failed, however, to give the aggregation of particles sufficient friability to disperse freely under the mill rolls for the contraction phenomena above mentioned drew the particles into so close an embrace that it created harshness in the black.

The means employed by Wiegand and Venuto to aggregate the particles and the means employed by them to

insure their dispersibility differed from everything that went before.

We have already described the means of aggregating the particles by tumbling and shaking them while wetted with gasoline. This constituted the patented process which is not here in suit. The patent also discloses a means whereby the aggregates of particles so formed are endowed with the ability of breaking down and dispersing under light pressure. This means, constituting an important physical characteristic of the product, is the porosity which prevails throughout the interior of the aggregate.

Since petitioners contend that this characteristic of the patented product is without significance (Brief, p. 6), it is necessary to consider it further.

A substantial part of the record is devoted to this characteristic of the patented aggregate (R. 72-94, 169-74, 190-95). The particles of carbon black being sub-microscopic —their diameter is one-tenth of the length of a wave of light—microscopic examination cannot disclose the form or degree in which the porosity occurs with any exactitude (R. 76-77). It is known, however, that its precise form, whether in discrete cells as in a honeycomb framework or in channeled condition, is inconsequential (R. 76-7, 192). The important thing is over-all porosity. As the patentees point out, even the outer surface of the pellets, though slightly more compact than the interior, is still porous (R. 250, 2/91-93).

Although the existence of this porosity in a given pellet cannot be accurately determined by visual examination (R. 76-77), it can be easily demonstrated by tests such as permitting the pellets to absorb a liquid (R. 77-8, 192-4) or by submerging the pellet in oil and observing the bubbles of air driven from its interior (R. 79, 194-5). However, the

simplest and best method of determining the degree of porosity present is by measuring the pellet density. It has been determined by mathematical calculation that a cubic foot of pellets of solid carbon of the size of the patented pellets weighs 87 pounds. The weight of a cubic foot of the porous pellets of the patent in suit is about 25 pounds. The patented pellet is thus somewhat more than two-thirds air (R. 74, 83-4, 191).

Petitioners complain, possibly because no exact limits of porosity appear in the claims, that the patent is indefinite about this characteristic of the pellet (Brief, p. 46). But it is horn-book patent law that the claims of a patent are to be read in the light of the specification,* and the specification of the patent in suit indicates clearly in terms of density what is the best degree of porosity. The patent states that "approximately twice the number of pounds of these pellets can be placed in a container of a given size than is the case with the untreated carbon black" (R. 229, 2/94-98). The untreated black of the day when that was written weighed 10 to 13 pounds per cubic foot (R. 23 and 279). Twice that is 20 to 26 pounds per cubic foot, a range within which petitioners' Sayre pellets, which weigh 24 to 26 pounds per cubic foot, squarely fall (R. 110, 123). Obviously petitioners have no cause for asserting that the patent is indefinite as to the degree of porosity.

We believe that the claims of the patent in suit should not be absolutely restricted to these limits since in the nature of the case it is not possible to put precise limitations on the degree of porosity which will be effective (R. 79-80). The patentees being the first to disclose this means of attaining

---

* *Carnegie Steel Co.* v. *Cambria Iron Co.*, 185 U. S. 403, 432; *Seymour* v. *Osborne*, 11 Wall 516, 547; *Mitchell* v. *Tilghman*, 19 Wall 287, 391-2; *The Corn-Planter Patent*, 23 Wall 181, 225-6.

dispersibility, and having clearly disclosed in their patent a range of porosity which any mechanic can follow in order to obtain an operative product, the patent should be held to include any pellet whose porosity effectively permits dispersion in the rubber mills even if some experimentation is required to determine it.* This was the position taken by Mr. Wiegand in his testimony (R. 87-88). This question is not presented here, however, since petitioners' pellets come within the particular range of porosity recommended in the patent.

The other physical characteristics of the patented product, that it be formed of substantially pure carbon black, and that it be round of shape and smooth of surface, have already been sufficiently discussed. The question now is whether the prior art patents relied upon by petitioners disclose this combination of physical characteristics which constitutes Wiegand and Venuto's invention and whether more than merely mechanical skill was required to perceive that this combination constituted the answer to the dust problem.

## The Prior Art

### Rodman Patents

The first patents relied on by petitioners are the Rodman patents (R. 436 and 439). The earlier of these patents is for a "case-hardening material" comprising an aggregate of 100 parts of finely powdered coking coal, 10 parts of sodium carbonate and 15 parts of calcium carbonate or hydroxide held together by "a tacky binder, such, for example, as a solution of molasses in water" (R. 436, 1/53-54). The powdered coke has an upper size of around 1/100 of an inch in diameter, approximately ten thousand times as

* *Minerals Separation, Ltd.* v. *Hyde*, 242 U. S. 261, 270-71 and cases cited.

large as carbon black particles. There is no suggestion that either the process or the product could be applied to carbon black. The second Rodman patent is for a method of building up pills by alternately moistening nuclei or centers with a binding agent such as molasses solution and rolling them in powder till the pills have been built up layer by layer to the desired size. The pills obviously lack the essential porosity which renders the Wiegand and Venuto product friable, they are not made of carbon black and they are not free from binders. The only relevancy of these patents is that they disclose agglomerates called "pebbles," the edges of which are rounded. They neither disclose nor suggest the product of the patent in suit which solved the carbon dust problem.

### Trent British Patents

The Trent British patents (R. 290 and 431) relied on by petitioners, disclose a water gravity concentration process for the separation of coal from the gangue materials, *i. e.*, silica, clay, etc., with which it is mixed. The process makes use of the well known attribute of oil which has an affinity for coal (and many other valuable minerals) while repelling water and gangue (R. 432, 2/106-109). The coal is ground to 200 mesh size (approximately five thousand times the size of carbon black particles) to loosen the coal from the gangue particles and is then mixed to form a suspension in water (R. 431, 1/52-63; 432, 2/11-16). A liquid hydrocarbon such as fuel oil, tar, pitch or oil residuums "which are solid at ordinary temperatures" is then added to the suspension (R. 431, 1/33-38). By reason of the preferential affinity of oil for the coal particles, an agglomeration of coal particles and oil occurs and these heavier agglomerates are then separated from the gangue by washing and overflowing (R. 433, 2/56-95). The agglomerated masses consist of a multitude of individual carbonaceous particles

that have been separately coated with thin films of oil (R. 292, 3/88-91). Sufficient oil is used "to fill up the spaces between the coal particles in the globular aggregate * * *" (R. 293, 4/29-32). The agglomerates precipitate as globules or masses of oil and coal of a "greasy nature," having a "dense plastic consistency," heavy and "free from air bubbles" (R. 290, 1/36-39; 291, 2/85-90; 292, 3/48-59; 431, 1/24-30, 1/75-80; 455, 4/1-3). These agglomerates are used as fuel and burn with but a slight ash (R. 434, 4/16-21). The patentee indicates that the oily binding agent can be removed, in which case the aggregate returns to its original particle state and can be used "as a powdered fuel" (R. 434, 4/21-24; R. 204-205).

The agglomerates of these Trent patents present a striking contrast to the product of the patent in suit since they are not formed of carbon black, are not free from binders, are not porous, and when dried return to dust. Their greasy nature and plastic consistency obviously deprive them of any capacity to flow. It would be hard to imagine an aggregate less suggestive of the patented product.

Petitioners say that these Trent patents are "all-important" (Brief, p. 12), but present no comment on them beyond a footnote (Brief, p. 5) asserting that the two patents disclose some part of the process described in the patent in suit. It is evident that the patents are as far removed from the Wiegand and Venuto process as they are from the Wiegand and Venuto product.

### Geer Patent

The prior art patent to Geer was issued in 1917 on an application filed in 1916, shortly after the flying of carbon black particles became recognized as a serious problem. The solution proposed by Dr. Geer was to moisten the black

with a comparatively small quantity of a volatile fluid and mix the black while still in a wet condition into the rubber, allowing the volatile liquid to evaporate in part from the batch of rubber on the rolls and in part from the finished vulcanized articles. In order to coat each particle of fluffy black with the small quantity of fluid used, one part of liquid to two parts of black, it was necessary to stir the fluid into the black and in the natural course of this operation the wetted particles concreted into grains by reason of the binding effect of the liquid and the whole mass was brought to "a granular condition" (R. 289, 1/18-24). The entire process, which involved the alternative use of water and kerosene, is disclosed in two sentences in the patent (R. 289, 1/30-40):

> "For example, I mix two parts, by weight, of gas-black with one part of kerosene oil in a suitable closed vessel which preferably contains rapidly-revolving paddles which assist the mixing and promote the attainment of the granular condition. The oil coats and concretes the particles as stated and brings the mass into a condition suitable for its proper distribution throughout the rubber on the heated rolls of the mixing mill."

Although Dr. Geer was head of the technical division of the Goodrich Rubber organization and widely known in the rubber industry (R. 26, 66), his process was never adopted, for in practice the volatile binding agent when introduced into the rubber mix either blows badly, forming huge porosities or bubbles in the rubber, or reduces the tensile strength of the rubber far below its original value (R. 202-3, 226).

Petitioners seek to read into the expressions "grains" and "granular condition" a disclosure of Wiegand and Venuto's round, smooth-surfaced aggregates of carbon black (Brief, pp. 7, 10). This point of view is unsound since sand and sugar are in "a granular condition," yet

the "grains" are neither round nor smooth and if made of carbon black would rub together, break corners and restore the dust problem (R. 19, 49). Such irregular grains are very different from the round, smooth aggregates of the patent in suit.

Moreover, the Geer agglomerates are not composed of pure carbon but contain a liquid binder (R. 202, 226), and they are not porous because the binder fills any interstitial spaces that might otherwise exist. The Geer patent thus fails to disclose even a single one of the material characteristics of the patented product.

Petitioners also suggest that only mechanical skill would be involved in drying Geer's grains, and they imply that thereby the patented product would be obtained (Brief, p. 7). But the fact is that if Geer's grains, prepared with fifty per cent. of liquid on the black as he directed, are dried out, they will simply fall back into dust (R. 202, 214). Furthermore, the removal of liquid from Geer's grains is directly contrary to the dominant thought of Geer's proposal, which is that the liquid be present up to the inclusion of the black in the rubber to serve as a binder for the particles of black and thus allay dusting.

Petitioners make one further effort to read into Geer a disclosure of anticipatory effect. They assert that the violent, tumbling, shaking, impact agitation disclosed by Wiegand and Venuto, which ultimately came to be recognized as the fundamental cause of pellet formation, was disclosed by Geer (Brief, p. 31). This assertion is based solely on Geer's statement that, for the purpose of coating the black with oil and concreting the particles, he mixes the black and oil "in a suitable closed vessel which preferably contains rapidly-revolving paddles which assist the mixing and promote the attainment of the granular condition" (R. 289, 1/32-35). This is to read the after-acquired knowledge of the art into a casual remark of an early discarded

prior art patent. The actual evidence on this point is that there is a great difference between stirring things around and around, even violently, and tumbling them end over end or shaking them so that by force of blows and impacts the carbon particles are pounded into shape (R. 195). Geer merely desired to impregnate the fluffy black with oil or water, and the stirring action he advised, however rapidly performed, would never have brought about pellet formation (R. 222).

Common sense leads to the same conclusion, for had Geer employed impact agitation and produced the pellets of the patent in suit, being a man highly skilled in the art, he would inevitably have recognized them. In such case the world would have had the benefit of the Wiegand and Venuto pellet in 1916 instead of twelve years later. The facts are that the world did not receive this benefit in 1916 and that Geer's thought and investigation did not go beyond the expedient of mixing his product into the rubber while in an oily or wet condition. Since rubber men regard the introduction of foreign matter into the rubber mix with great suspicion and would employ such an expedient only as a last resort (R. 14, 32, 65, 71, 200-201), it is impossible to believe that Geer ever obtained a product which would have avoided that necessity. It is noteworthy that neither petitioners, who now find so much in Geer's disclosure, nor any other person skilled in the art of mixing carbon black and rubber, perceived anything of value in the Geer patent until the appearance of the Wiegand and Venuto patent gave them the hindsight which they now so assiduously employ.

### Knowlton and Hoffman Patent

Petitioners also place great reliance on the patent to Knowlton and Hoffman which appeared in 1918. That patent is stated to be an improvement over Geer (R. 287,

1/60-63) and departs from Geer's procedure in three respects. It makes use of a binder described as "a soluble agglutinant such as glue, starch, dextrose or sugar" (R. 287, 1/38-39), it increases the amount of water mixed with the black from 50% on the black to a little over 400% (R. 287, 1/48-50), and it provides for drying "the resulting paste or syrup" in shallow evaporating pans before mixing the material with the rubber (R. 287, 1/53-55).

The patentees point out that the binder serves "to hold the particles of the material together in the desired form" (R. 287, 1/42-43) and that the binder remains in the lampblack "after evaporation of the water" (R. 287, 1/43-45). Speaking apparently of this binder process, the patentees state (R. 287, 1/21-31):

> "Instead of using the lampblack in its natural condition, we prepare and treat the fine powder so as to cause its concretion into friable grains or small lumps, dry and substantially free from dust, and in this form incorporate it with the rubber on the roller mill or in any suitable masticating apparatus heated in the usual way to soften the rubber, the friability of the lumps or grains permitting a uniform distribution of the filler throughout the rubber."

To this procedure the patentees add a variant (R. 287, 1/31-36):

> "We may use water or other volatile liquid alone as a concreting agent, first mixing enough of it with the lampblack to produce the desired condition, and then drying the mass before mixing it with the rubber * * *."

The only example of the relative quantities of water and black to be mixed together given in the patent is 240 parts of lampblack to 1000 parts of water (R. 287, 1/48-50). This is a little more than eight times as much water as Geer used.

The patent is thus primarily a binder patent with a non-binder procedure thrown in to cover all eventualities. Actually, neither process went into use although Hoffman was a man well known in the rubber industry and was connected with the Goodrich Rubber Company which experienced great difficulty with the dust problem throughout this period and spent a million dollars to segregate the dust nuisance (R. 26, 65-66). The binder product was useless since binders are harmful to the rubber (R. 200-201). The binderless product, by reason of the large quantities of water with which it was mixed, became a mud cake when dry which broke up during handling and restored the dust problem (R. 214-216). Moreover, this product, by reason of the surface tension and vortex action described in the patent in suit (*supra*, p. 11-12), contracted in the course of evaporation, forming hard clumps of particles throughout the product and creating a harshness which prevented thorough dispersion in the rubber mix (R. 218-219, 214).

In this connection we direct attention to the second paragraph of the patent in suit (R. 228, 1/26-42). That paragraph was written with the evaporation procedure of the type disclosed by Knowlton and Hoffman in mind. Wiegand and Venuto were familiar with this procedure which is fully disclosed in the Lewis patent (R. 281), which disclosure is identical with that of the Knowlton and Hoffman patent (*infra*, p. 40).

Petitioners assume to find in the expression "friable grains or small lumps" a disclosure of the round form and smooth surface of the Wiegand and Venuto aggregate. Knowlton and Hoffman's product is also described in their patent as being in a "granular or lumpy form" (R. 287, 1/68, 1/74, 1/87-88) and was described to Mr. Wiegand as "looking like an ash in irregular lumps" (R. 227). The only specific reference in the patent to the binderless

product describes it simply as a "mass" (R. 287, 1/35). We have already pointed out in connection with Geer that lumps of carbon black will not flow without regenerating dust. The lumpy irregular granules of the Knowlton and Hoffman patent simply do not disclose the smooth round form of the aggregate claimed in the patent in suit, nor do they disclose any progress whatever toward solution of the dust problem.

Moreover, and more important, the Knowlton and Hoffman patent fails to disclose the other material characteristics of the patented product. The Knowlton binder product is not pure carbon, is not free from binders, and is not porous. The binderless product is disclosed as pure, but there is no disclosure in the patent and no evidence in the record that the interior of the lump had any significant degree of porosity and it is established, as above pointed out, that in practice a lump of carbon black made according to Knowlton and Hoffman's procedure is harsh and therefore will not break down thoroughly on the rolls and disseminate through the rubber mix.*

---

* Petitioners state in their brief (p. 25-26) that samples of the Knowlton and Hoffman product made up by their expert, Dr. Drogin, show a spongy or porous interior under microscopic examination. This statement is rather surprising in view of the fact that no evidence was adduced at the trial to show that these samples had any significant degree of porosity, and no opportunity has been given respondent to test the assertion by cross examination. It does appear in the record, however, that Dr. Drogin's samples were made up by a process which employed as little as one-eighth of the water employed by Knowlton and Hoffman (R. 161) and in which the black was subjected to the violent agitation and the shaking and tumbling action disclosed by Wiegand and Venuto although no such direction appears in the Knowlton and Hoffman patent (R. 161-162). It is also the evidence that visual examination is of little use in determining whether an aggregate is porous in significant degree (R. 76-77).

Petitioners suggest that because Knowlton and Hoffman state that their invention is an improvement over Geer, it follows as a legal consequence that the two disclosures lose their identities and must be scrambled together to form a sort of grab-bag from which petitioners can choose isolated elements and combine them as they please. Petitioners insist that the Court below failed to apply this legal principle and that this was error (Brief, p. 28). As far as we know, no such rule of law exists, but the point is of no consequence. The elements selected from the two patents by petitioners in accordance with this alleged principle are the Geer agglomerate of low water content and the Knowlton and Hoffman step of evaporating the water. Put together, these elements lead petitioners to assert that after the Knowlton and Hoffman patent there was no novelty "in drying the Geer pellet" (Brief, p. 10). In point of fact there is no suggestion in Knowlton and Hoffman that carbon black agglomerates prepared with 50% water on the black as Geer recommended should be dried. On the contrary, one of Knowlton and Hoffman's improvements over Geer is to increase the amount of water stirred into the black by over eight times. But even had Knowlton and Hoffman suggested drying out Geer's granulated material, they would not have the Wiegand and Venuto product. All they would have is dust, for the mass would disintegrate to its original particles when the water had finally evaporated (R. 214).

What petitioners appear to mean (Brief, p. 8), though they do not state it clearly, is that no act of invention was involved in wetting carbon black in the ratio of one part of water to two parts of black as proposed by Geer, and subjecting the wetted mass to violent agitation as proposed, petitioners say, by Geer, and evaporating out the water as proposed by Knowlton and Hoffman. If all three of these

items were in fact proposed by those patentees and using them together were in harmony with their proposals, one would still have to consider whether their combination was an act of invention. However, consideration of that issue is not required because the stated hypothesis is faulty in at least three respects. First, the idea of evaporating out the water could be arrived at only by abandoning Geer's proposal whose basic idea was to utilize the presence of water, not its absence, to prevent dusting. Second, it is irrational to suggest use of Geer's water-carbon ratio with Knowlton and Hoffman's evaporation of the water, because Knowlton and Hoffman found it necessary to use the larger proportion of water in order to have the evaporation process produce an agglomerated product. Thirdly, neither Geer nor any one else prior to Weigand and Venuto suggested the application to wetted carbon black of the violent agitation which produces pellets of the kind here under consideration.

Petitioners also assert that the Court below held the patent in suit valid over Knowlton and Hoffman, not because they failed to disclose the Wiegand product, but simply because they disclosed no method of making it successfully, and they complain that this was error in view of *Cohn* v. *United States Corset Co.*, 93 U. S. 366, 377 (Brief, p. 22). Petitioners' assertion is incorrect. The Court below stated clearly with direct reference to Knowlton and Hoffman and other prior patents relied on by petitioners (R. 468):

> "None of these patents discloses any such product as is covered by the patent sued on."

The Court's reference to the process in its further discussion of the Knowlton and Hoffman patent is pertinent to this very issue, for in view of the fact that the patent makes only a few general remarks about the product and

its desired performance and gives no details as to the physical characteristics of the product itself, these characteristics must be largely deduced from the procedures disclosed in the patent.

In conclusion it is clear that in the Knowlton and Hoffman patent, as in the Geer patent, petitioners now see directions and disclosures which all the men skilled in the art who were familiar with those patents failed to see throughout the ten years of the "dust era" though continually prodded to further effort by the incessant demand for a solution of the dust problem.

### Lewis Patent

This Lewis patent (R. 281) is substantially a duplicate of the Knowlton & Hoffman patent. It describes making aggregates of carbon black with a binder (R. 282, 1/28-73), and, in addition, it describes aggregating carbon black particles with a volatile liquid like water, alcohol and gasoline, and then driving off the liquid by evaporation (R. 282, 1/1-17).

The patentee Lewis was a man well known in the carbon black industry (R. 29). His proposal was tried out sufficiently to establish that it produced only useless mud cakes and nothing was heard of it thereafter (R. 216).

Petitioners state (Brief, p. 7, 12) that the Knowlton and Hoffman patent was not considered by the Patent Office in connection with the application for the patent in suit. The Patent Office Examiner cited this Lewis patent (R. 317, 344, 358), and, having done that, there was no occasion to cite Knowlton and Hoffman whose disclosure added nothing to that of Lewis.

## Coffin and Keen Patent

The patent to Coffin and Keen, which issued in 1925 on an application filed in 1923, contains no reference to carbon black or to any carbon product.

The patent has for its objects "to provide a method for directly drying clay and similar material in subdivided form" and "to provide a dry clay or similar material in a fine granular form" (R. 297, 1/47-56).

The patent describes the method contemporaneously employed for drying clay for use as a rubber filler. The various steps are listed as mixing the clay with water to form an aqueous suspension called a "slip," removing grit, large particles and some of the water, filtering to remove the bulk of the remaining water, drying the wet clay on racks on which it is disposed in lumps and subjected to heat, subjecting the clay to a second drying operation and finally reducing it to powder for use in rubber compounds (R. 297, 1/18-46). The patentees point out that by use of their process the "filtering step, one drying step, and the pulverizing step of the previously known method" are eliminated (R. 299, 3/10-15).

The patentees summarize their new method of drying clay which comprises a series of steps as follows (R. 297, 1/57-66):

> "The method comprises broadly treating a pulverulent material such as clay in fluid suspension to remove large particles therefrom and subsequently to reduce its fluid content, and then finely dividing the treated suspension to form it into small globular masses which are then dried in the form of small globules of lightly cohering particles of the material while in suspension in a gaseous drying medium."

The patent proceeds to detail the various steps in the process, the step of forming a slip and removing large particles being described as follows (R. 297, 1/87-92):

> "In carrying out the invention the clay, if not already in the form of a 'slip' through hydraulic mining, is mixed with water to form a suspension, and the larger particles such as grit, pebbles, etc., removed by settling."

The patent then details the step of reducing the fluid content of the slip (R. 297, 1/92-96):

> "The 'slip' is then allowed to further settle to remove a part of the water, and the thickened but still fluid clay is pumped to the drying apparatus shown in Figs. 1 to 3."

The patent then proceeds to describe at some length the drying apparatus which consists generally in an enclosed insulated chamber disposed above a furnace from which arises a mixture of heated air and combustion products which ascends through the atmosphere of the chamber and escapes by way of an outlet in the ceiling. Along one wall of the chamber and adjacent the ceiling a plurality of spray nozzles are disposed in a double row, so positioned that the mixture of hot air and combustion products which is introduced to the chamber at a temperature ranging from 500° to 700° Fahrenheit is compelled to pass through the spray discharged by the nozzles (R. 297, 1/96-2/51; 2/64-81).

The patent then outlines the step of "finely dividing the treated suspension to form it into small globular masses" as follows (R. 298, 2/52-56):

> "In carrying out the method the clay, which has been purified and partly freed of water as before

described, is supplied to nozzles 19 and sprayed transversely into the drying chamber."

The action of the nozzles in forming the "small globular masses" is not further described in the patent. The patent continues with the final drying step (R. 298, 2/56-65):

> "The globular sprayed particles in their descent come in contact with the ascending current of the drying medium * * * and the dried material deposits as very small globular masses or pellets on the sides of the hoppers 2, while the exhaust drying medium escapes through the opening 13 and thence to the outer air."

The patent then proceeds to describe the dried material in considerable detail, stating (R. 298, 2/86-92, 2/101-106, 2/122-3/5):

> "The dried clay as before stated deposits in the hoppers in the form of very small friable globular masses or pellets, each of which is an aggregate of lightly cohering particles of clay, and the product very much resembles a fine sand in its appearance to the naked eye."
>
> * * * * * *
>
> "Due to the rounded granular form in which the clay is obtained and the absence of any sharp particles it is extremely fluent and, therefore, can be very readily handled as compared with the compact mass formed when clay is in a pulverized state."
>
> * * * * * *
>
> "As before stated, the dried grains or pellets are very small and the individual particles of clay forming them are only lightly held together, so that a very slight pressure such as that of the fingers is sufficient to crush the grains, but the bond between the particles is sufficiently strong to substantially prevent their breaking up during handling.

> Hence the product is entirely suitable as obtained from the drying chamber for use directly in the rubber mill. Due to its form the objectionable dusting which occurs in the mixing and handling of finely powdered materials is also avoided."

The patent concludes with a statement that the invention is applicable to certain other rubber fillers, though reinforcing agents such as carbon black are not mentioned (R. 299, 3/16-23):

> "The invention is widely applicable for efficiently drying any pulverulent material, such as other rubber fillers, which is desirably ground wet in a fluid in which it is insoluble, or in which objectionable dusting occurs in handling. Samples of materials for which our invention may be used are, whiting, barytes and lithopone."

It thus appears that the Coffin and Keen patent discloses aggregates of clay and analogous materials which have a round form and a smooth surface which give them the capacity to flow in the same manner as the Wiegand and Venuto pellets. The patent contains no disclosure, however, of a round smooth pellet formed purely of carbon black particles nor yet any disclosure of a pellet of any kind having a porous or spongy interior. The patent thus fails to disclose two of the essential characteristics of the Wiegand and Venuto product.

Ignoring the lack of disclosure of porosity, petitioners insist that the Wiegand and Venuto patent is invalid for lack of invention over Coffin and Keen on the principle that the mere substitution of one material for another is not invention (Brief, pp. 35-37). But the principle of substitution of materials has absolute application only in the case of machines where the use of one material instead of another in constructing the parts of the machine

obviously cannot change the identity of the machine itself. The present case relates to an article of manufacture analogous to a composition of matter, where, as this Court pointed out in *Hicks* v. *Kelsey*, 18 Wall. 670, 674: "a different ingredient changes the identity of the compound." Thus, even if this were the sole difference between the patents, the Court would have to consider whether the formation of pellets out of carbon black was obviously indicated to those skilled in the art by Coffin and Keen's disclosure of pellets formed of clay. (*Corpus Juris, Patents*, Substitution of Materials, pp. 73-74.) On this point, the fact that petitioners have furnished no evidence that the laws governing the action of particles of carbon black are similar to the laws governing the action of clay particles, the fact that Coffin and Keen's procedure is one of drying a substance which is produced wet whereas carbon black as produced is dry, the fact that Coffin and Keen did not associate their invention with carbon black in spite of their certain knowledge of the dust problem, and the fact that in the five years intervening between Coffin and Keen's date of invention and the public appearance of Wiegand and Venuto's product, men skilled in the art who were seeking a solution failed to find any help in the Coffin and Keen disclosure, constitute evidence that such a step was not obviously indicated.*

But the rule invoked by petitioners is entirely inapplicable to the present case. The Coffin and Keen patent

---

*The Coffin and Keen patent was not the work of amateurs which languished obscurely in the files of the Patent Office. While still in application form the invention was assigned to the Naugatuck Chemical Company and the patent issued to that company (R. 297, statement of assignment). The Naugatuck Company is one of the big rubber companies (R. 25).

not only fails to disclose a pellet made of carbon black, but fails utterly to disclose a vitally important physical characteristic of the Wiegand and Venuto aggregate, its high degree of porosity.

The Coffin and Keen patent discloses no degree of porosity whatever in the clay pellets there described and contains no matter from which the existence of porosity can be reasonably deduced. No pellets produced by the Coffin and Keen process were introduced into evidence for examination and the record contains no evidence whatever that aggregates so produced would be porous in any degree. Nevertheless, petitioners make the surprising statement in their brief that the Coffin and Keen pellets are "spongy or porous" (Brief, p. 26). This assertion is explained in a later section of the brief where petitioners say of the Coffin and Keen aggregates, "they have a 'spongy or porous' interior, *i. e., are friable*" (Brief, p. 35. Emphasis ours.).

In this conception petitioners are profoundly mistaken. Porosity and friability are not synonymous, nor is one necessarily the property of the other (R. 221). Concrete, for example, is porous but is not in the least friable, while grains of ordinary violin rosin are not at all porous but are easily friable between the fingers. The most that can be said is that in the case of carbon black, a high degree of porosity will cause friability (R. 221).

It is equally clear, however, that friability, whether in carbon black or in other materials, may be obtained by other means. Thus, particles of matter may be held together by means of an agglutinant, liquid or solid, which will bind the particles only lightly so as to permit their dispersion under slight pressures. This, indeed, was the device of the prior art binder patents. Another means is

the slight melting of the surfaces of discrete particles so that they will fuse lightly together. The creation of internal stresses and strains in an agglomeration of particles will also cause them to disintegrate under slight pressures as in the case of water-quenched globules of glass, the famous Prince Rupert's Drops. Or simply the degree of cohesion and adhesion present, or of molecular attraction in the case of particles sufficiently small, may bring about the condition of friability.

In view of these facts it is plain that the mere statement in the Coffin and Keen patent that the clay pellets are friable is no foundation for petitioners' deduction that those pellets were porous, or, in particular, that they had the highly porous interior which characterizes the product of the patent in suit.*

The internal evidence to be gleaned from the Coffin and Keen patent itself tends to indicate that no significant degree of porosity, if any, existed in the clay pellets.

The aggregations apparently first occur in the step comprising "finely dividing the treated suspension to form it into small globular masses" (R. 297, 1/61-63). As we pointed out above, the patent simply states that this step is effected by supplying the fluid clay to nozzles and spraying it into the drying chamber. The operation of the nozzles is not disclosed. Whether the aggregates are tiny bodies inhering in the clay itself when hydraulically mined and sifted out by the nozzles, or whether they

---

* Actually there is no evidence in the record that any Coffin and Keen aggregates were ever made, or that such aggregates, if made, would, as stated in the specification, be sufficiently friable for complete dispersion. It will be remembered that the Knowlton and Hoffman patent contained a similar assertion which actual practice proved to be false.

are formed by squeezing the particles together under pressure in the nozzles themselves does not appear. All that appears is that these "globular particles" are sprayed out into the violent heat of the drying chamber, are dried in process of falling through the heated air, and deposit as dry "globular masses or pellets" upon the floor of the chamber (R. 298, 2/56-64). It is even conceivable that this sudden exposure to high degrees of heat (500° to 700° F.) causes some chemical reaction, or some variation of the contraction phenomena observed by Wiegand and Venuto, which creates "the bond between the particles" (R. 298, 2/127-130). The matter is simply left unexplained. There is no reason to suppose that aggregates formed by any of these means would have any significant degree of porosity.

It is stated in the patent that "the product very much resembles a fine sand in its appearance to the naked eye" (R. 298, 2/91-92). But sand is not porous. Moreover, the language chosen by Coffin and Keen to describe their aggregates tends to establish that they relied solely on a nicely balanced cohesion between the clay particles to insure their dispersibility. It is stated in the patent that the individual particles of clay forming the aggregates are "only lightly held together" and that "the bond between the particles" is just strong enough to prevent breakage during handling (R. 298, 2/124-125; 2/127-130). The product is further described in the specification as "an aggregate of lightly cohering particles of clay" (R. 298, 2/89-90) and in the claims as "minute globular masses composed of lightly cohering particles of clay" (R. 299, 3/45-46, 3/53-54, 3/62-63, 3/69-70). Porosity is nowhere mentioned nor indicated.

Tracing the results that would be obtained from the process disclosed in the Coffin and Keen patent if it were applied to carbon black, to produce a pellet in the form of

Coffin and Keen's pellets, leads to the same conclusion. Coffin and Keen assert that by their process they obtain a pellet of clay sufficiently friable to disperse in the rubber mix. There is no doubt, however, that a pellet of carbon black formed by such a process (assuming that a pellet would form at all) would lack the necessary degree of friability, would be harsh, and would not disperse in the rubber mix. On this point, the evidence is uncontradicted that the amount of water required to reduce carbon black to a condition in which it could be sprayed as directed in the Coffin and Keen patent is of the order of eight parts of water to one part of carbon black—almost double the amount of water used by Knowlton and Hoffman. The presence of this water would be fatal to production of a pellet product; instead, the product would be a multiplicity of little mud cakes which would not disperse in the rubber (R. 212-213). In point of fact, the process disclosed could not be applied to carbon black at all since wetted carbon black will burn up when exposed to the temperatures indicated in the patent and at such temperatures there is even a serious danger of explosion (R. 213).

Thus the Coffin and Keen patent not only fails to disclose an aggregate of carbon black, but it fails to disclose an aggregate of any kind in which the vital feature of the product of the patent in suit, its highly porous interior, is present. The patent contains no internal evidence from which this feature can be deduced, and discloses no process which would produce such a product.*

In view of this hiatus in the Coffin and Keen patent, petitioner's failure to introduce any extrinsic evidence of

---

* It is obvious that, in view of the fact that Coffin and Keen do not disclose the product of the patent in suit, *Cohn* v. *United States Corset Co.*, 98 U. S. 366, relied on by petitioners (Brief, p. 22) has no application here.

porosity becomes very significant. Although the primary importance of the highly porous interior of the patented pellet as the means which give it the capacity to disperse in the rubber mix was brought to petitioners' attention early in the trial (R. 83), petitioners nevertheless refrained from submitting any evidence on this point which might be the subject of cross examination and rebuttal. Their expert testified with regard to the other prior art patents relied on here but avoided all mention of Coffin and Keen. It is impossible to believe that petitioners would have adopted this course if in fact their investigations had disclosed that clay aggregates made in accordance with the process disclosed by Coffin and Keen had any significant degree of porosity. It has long been recognized that where a party deliberately refrains from presenting evidence available to him under such circumstances, particularly where, as here, the burden of proof is upon his shoulders, his silence raises a strong inference that a full exposition of the matter would lead to a conclusion unfavorable to him. As this Court said in the recent case of *Interstate Circuit, Inc., et al.* v. *United States,* 306 U. S. 208, 226:

> "The production of weak evidence where strong is available can lead only to the conclusion that the strong would have been adverse. *Clifton* v. *United States,* 4 Hos. 242, 247. Silence then becomes evidence of the most convincing character. *Runkle* v. *Burnham,* 153 U. S. 216, 225; *Kirby* v. *Tallmadge,* 160 U. S. 379, 383; *Bilokumsky* v. *Tod,* 263 U. S. 149, 153, 154; *Vajtauer* v. *Commissioner of Immigration,* 273 U. S. 103, 111, 112; *Manmouth Oil Co.* v. *United States,* 275 U. S. 13, 52; *Local 167* v. *United States,* 291 U. S. 293, 298."

This rule has been applied in patent cases where an infringer refrains from introducing available evidence in support of a contention of anticipation and lack of invention (*Loom Company* v. *Higgins,* 105 U. S. 580, 594).

## Summary of the Prior Art

In concluding this discussion of the prior art patents relied on by petitioners we wish to point out that in patent cases the burden of proving lack of novelty and lack of invention is on the shoulders of the infringer and that that burden is a singularly heavy one. As was stated by the Court in *Bernard Joseph Mumm* v. *Jack E. Dacker & Son*, 301 U. S. 168, 171:

> "Not only is the burden to make good this defense upon the party setting it up, but his burden is a heavy one, as it has been held that 'every reasonable doubt should be resolved against him.' *Id.*, *Cantrell* v. *Wallick*, *supra*; *Coffin* v. *Ogden*, 18 Wall. 120, 124; *The Barbed Wire Patent*, 143 U. S. 275, 284, 285; *Adamson* v. *Gilliland*, 242 U. S. 350, 353. What must be so completely established by the defendant cannot be regarded as a part of the plaintiff's case * * *."

Simple analysis of the prior art patents relied on by petitioners makes it plain that this burden has not been successfully carried, for, taking the patents singly or in combination, they fail completely to detract from the novelty of the Wiegand and Venuto product defined by its essential physical characteristics.

No one of the prior art patents discloses the conception that the requisite friability can be imparted to aggregations of carbon black particles by creating a high degree of porosity throughout the interior of the aggregate. The art knew how to stick particles of carbon black together without the use of a binder, but they did not know how to make them come apart again. Wiegand and Venuto described and disclosed a means of giving a round, smooth surfaced aggregate composed purely of carbon black particles this

essential capacity, and they are entitled to a monopoly of the carbon aggregates defined in their claims which employ this means for obtaining that valuable result.

## Invention

Although petitioners raise questions of infringement and estoppel, the principal issue in this case is that of invention.

The question of invention, which arises in almost all patent cases which come before the courts, is one which has justly earned for this field of jurisprudence the title of "the metaphysics of the law" (*Robinson on Patents*, Vol. I, p. viii). The niceties of the question can never be avoided, for no invention however far-reaching in its effect has yet appeared that did not stand upon the shoulders of what went before. The advance of knowledge in the field of technological development, as in other fields, is inevitably a process of accumulation. It is the task of the Patent Office and of the courts to recognize and pick out from the mass of constantly renewed material those developments which are of so unusual a nature that they create the reasonable inference that in the ordinary course of events they might not have appeared until many years later or even, conceivably, not have appeared at all. For such exceptional achievements Congress has authorized the grant of patents, having in mind the ultimate benefits thereby assured to the public.

This concept of invention was concisely stated in its traditional form by Mr. Justice Clifford in *Dunbar* v. *Myers*, 94 U. S. 187, 197:

> "Invention or discovery is the requirement which constitutes the foundation of the right to obtain a patent; and it was decided by this Court, more than a

> quarter of a century ago, that unless more ingenuity and skill were required in making or applying the said improvement than are possessed by an ordinary mechanic acquainted with the business, there is an absence of that degree of skill and ingenuity which constitute the essential elements of every invention. *Hotchkiss* v. *Greenwood*, 11 How. 267."

Subsequent efforts to define this concept more precisely met with little success. The experience of the courts was summed up in *McClain* v. *Ortmayer*, 141 U. S. 419, where Mr. Justice BROWN stated the difficulty as follows (pp. 426-7):

> "What shall be construed as invention within the meaning of the patent laws has been made the subject of a great amount of discussion in the authorities, and a large number of cases, particularly in the more recent volumes of reports, turn solely upon the question of novelty. By some, invention is described as the contriving or constructing of that which had not before existed; and by another, giving a construction to the patent law, as 'the finding out, contriving, devising or creating something new and useful, which did not exist before, by an operation of the intellect.' To say that the act of invention is the production of something new and useful does not solve the difficulty of giving an accurate definition, since the question of what is new as distinguished from that which is a colorable variation of what is old, is usually the very question in issue. To say that it involves an operation of the intellect, is a product of intuition, or of something akin to genius, as distinguished from mere mechanical skill, draws one somewhat nearer to an appreciation of the true distinction, but it does not adequately express the idea. The truth is the word cannot be defined in such manner as to afford any substantial aid in determining whether a particular device in-

> volves an exercise of the inventive faculty or not. * * * Courts, adopting fixed principles as a guide, have by a process of exclusion determined that certain variations in old devices do or do not involve invention; but whether the variation relied upon in a particular case is anything more than ordinary mechanical skill is a question which cannot be answered by applying the test of any general definition."

Even the guiding principles referred to by Mr. Justice BROWN, such as the rule of thumb that a change of material does not involve invention, have done little to clarify the situation, for ultimately in every case exceptions have been encountered and the rule reverts to the original conception, *i. e.*, in the example given: A change of material does not involve invention *except where it is the product of something akin to genius as distinguished from mechanical skill.* Thus the law is forced back to its starting point.

But from the earliest days, in making the critical distinction between mechanical skill and invention, the courts have refused to rely on the vagaries of subjective opinion alone, and have sought objective evidence which would point the way to a correct decision. This evidence was found in the history of the art in which the particular invention appeared and in the actual impact upon the industry of the invention itself. The importance of the deductions to be made from such facts in resolving the question of invention was stated fairly recently by Judge LEARNED HAND of the Second Circuit Court of Appeals in the case of *Dubilier Condenser Corporation* v. *New York Coil Co.*, 20 F. (2d) 723, 724-5 as follows:

> "In all inventions the safest test is the condition of the art before and after the putative invention appears. At least that is an immeasurably safer test,

when available, than any *a priori* conclusions as to what is or is not an obvious step. To the last we should not resort, except in cases of absolute necessity."

We do not understand that this Court in its recent decisions, particularly *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, has turned its back upon these objective considerations or sought to weaken their force. It is our understanding that the Court has done no more than to reaffirm its adherence to the original standard of invention first laid down in *Hotchkiss* v. *Greenwood*, 11 How. 248, a standard which has been allowed to slip in some degree in recent decades. Consequently we wish to draw the Court's attention to certain facts appearing in the present case which traditionally have been given weight in deciding the question of invention.

One of the historical facts early relied on by the courts as helpful in distinguishing between invention and mechanical skill was the reaction of the industry to the appearance of the new device or product. Where the new device went into widespread use and displaced other devices previously employed for analogous uses, this fact was generally considered to be some evidence that the new device exhibited patentable invention (*Consolidated Safety-Valve Co.* v. *Crosby Steam Gauge & Valve Co.*, 113 U. S. 157, 179; *Magowan* v. *New York Belting & Packing Co.*, 141 U. S. 332, 343; *Sessions* v. *Romadka*, 145 U. S. 29, 44; *Keystone Manufacturing Co.* v. *Adams*, 151 U. S. 139, 143). It was early recognized, however, that evidence of commercial success could not always be relied on and that lavish expenditures in advertising or the mere whim of the public might well create a large demand for a device whose novelty was trifling. In view of this intrinsic weakness of the evidence it became the established

rule that evidence of commercial success, standing alone, could resolve the question of invention in favor of the patent only where that question was in doubt (*Krementz* v. *The S. Cottle Co.*, 148 U. S. 556, 560-61). But it was also appreciated that widespread use of a new device, when coupled with certain other historical facts, was a far more reliable indication of invention and entitled to much greater weight. Specifically, where the widespread adoption of a patented device or product results from a demand or recognized need for such a device which has continued unfulfilled for a substantial period of time preceding the appearance of the patented article, a strong inference of invention is raised. This was recently pointed out by this Court and the reason behind the rule explained in *Paramount Publix Corp.* v. *American Tri-Ergon Corp.*, 294 U. S. 464, 474, where Mr. Chief Justice Stone said:

> "Evidence of great utility of a method or device, it is true, may in some circumstances be accepted as evidence of invention. Where the method or device satisfies an old and recognized want, invention is to be inferred, rather than the exercise of mechanical skill. *For mere skill of the art would normally have been called into action by the generally known want.* See *Loom Co.* v. *Higgins*, 105 U. S. 580, 591; *Krementz* v. *Cottle Co.*, 148 U. S. 556, 560; *Hobbs* v. *Beach*, 180 U. S. 383, 392; *Carnegie Steel Co.* v. *Cambria Iron Co.*, 185 U. S. 403, 429, 430; *Expanded Metal Co.* v. *Bradford*, 214 U. S. 366, 381." (Emphasis ours.)

In the present case there can be no dispute that the patented product, a pellet of pure carbon black, round in shape, smooth of surface, and having a spongy or porous interior, has gone into widespread use and displaced almost entirely the only product previously employed for

analogous uses, i. e., heavy compressed black (*supra*, p. 18-20).

Petitioners do not dispute these facts but insist that this commercial success cannot be attributed to the product of the patent in suit because the claims must be limited in various ways to the exclusion of the product that has actually been used. Petitioners' contentions are matters of law bearing on infringement, not matters of fact bearing on invention, and they will be discussed in their proper place (*infra*, p. 61-65). The question here is whether or not the product actually claimed, the material characteristics of which are freedom from binders, roundness, smoothness, and porosity, attained the dignity of invention, and there can be no question that the products sold by both respondent and petitioners to the exclusion of the old compressed black have every one of these characteristics.*

It further appears that this widespread use of the patented product and its displacement of the compressed form of black in previous use occurred because the new product satisfied an old and recognized want (*supra*, p. 4-5). The existence of the dust nuisance in the rubber industry throughout the period 1915 to 1929 and the pressing need for some device or product which would ameliorate the intolerable conditions incident to the use of carbon black

* Considering only petitioners' pelleted products made by the single-liquid process at the Sayre plant and other plants similarly equipped, it still appears that petitioners sold 52,188,793 pounds of the patented pellet in the four years from 1937 to 1940 inclusive (R. 185). It is impossible to explain away such figures, or the sales by respondent of 243,759,000 pounds in eleven years from 1929 to 1939 inclusive (R. 32-3), on the basis of unproven advertising expenditures (R. 66).

in rubber are evidenced by patents which preceded the patent in suit,* and by patents which followed it.** Respondent's witnesses also testified at length concerning these conditions (R. 11-17, 25-29, 62-70, 72, 218) and petitioners acknowledged that the problem existed from 1915 on for a dozen years or more, that it was serious, and that it presented a recognized need for some improvement which would cure the condition (R. 24, 150-51).

These circumstances of long felt, persistent, and recognized need for a product which would solve the dust problem coupled with the widespread adoption of the patented product in the period following its introduction to the industry, create a strong inference of invention, for it is

---

| | | |
|---|---|---|
| *1,245,700 | Geer | Applied for in 1916; issued in 1917. Lines 9 to 17 (R. 289). |
| 1,263,082 | Lewis | Applied for in 1917; issued in 1918. Page 1, lines 11-17, 10-67 and page 2, lines 23, 54 to 66 (R. 281). |
| 1,286,024 | Knowlton & Hoffman | Applied for in 1917; issued in 1918. Lines 16 to 20 (R. 287). |
| 1,405,439 | Randall | Applied for in 1917; issued in 1922. Page 1, lines 10 to 27 (R. 283). |
| **2,120,540 | Billings & Offutt | Page 1, col. 1, lines 1-10, 48-54; col. 2, lines 3-31; page 2, col. 2, lines 49-54 (R. 234). |
| 2,120,541 | Billings & Offutt | Page 1, col. 1, lines 18-37 (R. 239). |
| Re; 19,750 | Billings & Offutt | Page 1, col. 1, lines 6-16, 22-37, 51-54 (R. 248). |
| Re: 21,390 | Grote | Page 1, col. 1, lines 5-16 (R. 267-9). |
| 2,127,137 | Price | Page 1, col. 1, lines 14-24; page 2, col. 1, lines 11-24 (R. 270). |
| 2,131,686 | Heller & Snow | Page 1, col. 1, lines 5-44 (R. 275). |



plain that if all that was needed to devise the product of the patent in suit was mechanical skill, such a product would have been forthcoming long before it actually appeared (*Paramount Publix Corp.* v. *American Tri-Ergon Corp., supra*).

These circumstances are reinforced by the fact that during the period when the demand for a solution of the dust problem remained unsatisfied numerous other inventors skilled in the art sought to meet that demand without success. The unsuccessful efforts of Lewis, Geer, Randall, Knowlton & Hoffman, and others to meet the problem solved by Wiegand and Venuto have already been referred to (*supra*, p. 5-8). These men were men of prominence in the rubber and carbon black industries (R. 5-9, 29-49). Dr. Geer is a recognized authority on rubber manufacture and the author of one of the best known books on that subject. He is generally recognized as one of the leaders in rubber manufacture on the technological side and the man who introduced scientific research in the rubber manufacturing art (R. 26, 66). Yet for all their efforts, none of these men conceived the product of the patent in suit which met the demand they were seeking to satisfy, and the products which they did devise were rejected by the industry as useless.* In view of the failure of these men to perceive what Wiegand and Venuto saw, it is difficult to accede to petitioners' contention that any skilled mechanic could have seen it had he applied himself to the matter.

---

* At the trial thirty-eight prior patents were introduced in evidence, the vast majority of which have been eliminated from the present record. The Court below pointed out that this large number of unsuccessful efforts to solve the dust problem so evidenced served further to weaken petitioners' contention that the successful solution of the problem lacked novelty (R. 468).

The strong inference of invention raised by the unsuccessful efforts of prior inventors has always been recognized by this Court (*Smith* v. *Goodyear Dental Vulcanite Co.*, 93 U. S. 486, 495; *The Barbed Wire Patent Case*, 143 U. S. 275, 282-3; *Gandy* v. *Main Belting Co.*, 143 U. S. 587, 594; *Krementz* v. *S. Cottle Co.*, 148 U. S. 556, 560; *Carnegie Steel Co.* v. *Cambria Iron Co.*, 185 U. S. 403, 445-6; *Expanded Metal Co.* v. *Bradford*, 214 U. S. 366, 381) and by the lower courts (*Ruben Condenser Co. et al.* v. *Copeland Refrigeration Corp.*, 85 F. (2d) 537, 541; *Hoeltke* v. *C. M. Kemp Mfg. Co.*, 80 F. (2d) 912, 919; *General Electric Co.* v. *U. S. Electric Mfg. Co.*, 63 F. (2d) 764-5-7; *National Battery Co.* v. *Richardson Co.*, 63 F. (2d) 289, 292).

It thus appears that the historical facts of this case fall into a pattern which is entirely at variance with petitioners' insistence that the invention of the patent in suit was an obvious deduction from scientific principles and facts commonly known to the industry of which any mechanic skilled in the art was capable. The prior art patents and inventions advanced by petitioners as disclosing the necessary elements for solution of the problem were well known to the industry for years prior to the application for the patent in suit, and the prior art patentees themselves were eminent in the field and in a position to put their inventions into practice without difficulty. Yet these disclosures were never availed of by the art and in spite of the crying need for a dustless form of carbon black, no one perceived in them what petitioners now assert to have been obvious. These inconsistencies are underlined by petitioners' acts, for though they give the tribute of their praise to the prior art, they give the product of the patent in suit the tribute of their imitation (*Diamond Rubber Co. of N. Y.* v. *Consolidated Rubber Tire Co.*, 220 U. S. 428, 440). We submit that petitioners have failed to carry

their burden of proving lack of invention beyond a reasonable doubt and that the patent in suit should be sustained.

## Infringement

The product alleged to infringe claims 1 and 2 of the patent in suit is the pelleted carbon black made by petitioners at their plant at Sayre, Texas. A sample of that product supplied to respondent by petitioners is in evidence as Plaintiff's Exhibit No. 20.

The commercial Sayre pellets are approximately 1/16 of an inch in diameter, have smooth rounded surfaces calculated to render the pellets flowable, are composed of substantially pure carbon black, and have spongy or porous interiors (R. 73). The rubber industry requires substantial purity of the pellets and prescribes rigid specifications as to degree of purity which petitioners' pellets satisfy (R. 166-168). The degree of porosity of petitioners' pellets falls squarely within the range recommended in the patent in suit. On this point petitioners' expert admitted that the Sayre pellets are double the density of uncompressed black as recommended by Wiegand and Venuto (R. 168 and 229, 2/95-98). There is consequently no doubt as to infringement if the claims in suit are given the interpretation their language naturally imports.

Petitioners insist that the claims must be limited to a product produced by the two-liquid process described in the patent in suit, asserting that the pellets produced by that process have a peculiar softness, the porous interior being in contrast to petitioners' "very dense" pellets (Brief, pp. 41, 49). This contention is based upon the testimony of petitioners' expert, Dr. Drogin, regard-

ing the qualities of certain pellets manufactured by him in *ex parte* experiments in which he allegedly practiced the process disclosed in the patent in suit. On cross examination he admitted that in preparing the samples on which this testimony was based he did not subject the material to the violent shaking and tumbling agitation prescribed in the patent, and that instead of doubling the density of the carbon black from 12½ pounds to 25 pounds per cubic foot as the patent recommends, he raised the density only half way, to 17 pounds per cubic foot (R. 174-5, 195-6). Dr. Drogin further admitted that he was well aware that pelleted black of a density less than 20 pounds per cubic foot was undesirable to the rubber companies because it was soft and broke down in transit and handling (R. 165, 179-180). Since Dr. Drogin's entire testimony with regard to the qualities of the "Wiegand & Venuto pellet" is based on the product of this falsified process, it consequently can be given no credence whatsoever.

In this connection it should be pointed out that this meretricious experiment is also the basis of petitioners' contention that the product of Weigand and Venuto's process had no commercial success because it was too soft to withstand bulk handling methods (Brief, pp. 15, 17-19). The only other evidence relied on to support this contention is the statement by Mr. Billings that sometime prior to 1932 he saw a sample of the Wiegand and Venuto product delivered in paper bags which had broken down inside of the bags and looked like "black scrambled eggs" (R. 152-153). Mr. Billings admitted that he did not know what treatment the bags of black had suffered before he saw them, that he had seen other samples of the Wiegand and Venuto product of that period which were "a good product," and that plaintiff's Exhibit 11, a sample of the orig-

inal Wiegand and Venuto two-liquid product offered at the trial, has no resemblance to scrambled eggs and appears to have all the commercial requirements (R. 152-153). Thus there is no acceptable evidence in support of petitioners' suggestion that the two-liquid pellets were a commercial failure and the contrary is clearly indicated by the steady increase in the sale and use of that product through the years 1929, 1930 and 1931, years in which it was so difficult to maintain the volume of sales of a known product that increasing the volume of sales of a new and more expensive product was almost unknown and beyond hope. The positive evidence in the case is that except for cost of production there is no difference of any consequence between the product of the two-liquid process as practiced by respondent from 1928 to 1931 and the product of the single-liquid process as practiced by respondent from 1932 to the present and the product of the single-liquid process as practiced by petitioners from 1937 to the present (R. 20, 22, 42, 43, 49, 54, 59, 187, 191-92, 199, and 73).

Since the product of the two-liquid process is identical with the product of the single-liquid process, there is no basis for restricting the claims in suit in any respect related to the process of manufacture. It will doubtless be noted that petitioners' suggestion that these product claims be limited to the product of the described process would make them into useless surplusage, and also that, because of later inventions and changes of manufacturing technique, the claims so limited would have no application to the products of petitioners or respondent.

Petitioners also contend, however, that the claims should be restricted to distinguish them from claims which were rejected in proceedings in the Patent Office in which Wiegand and Venuto acquiesced.

The claims referred to by petitioners include claims 4 and 8 which were cancelled after rejection by the Board of Appeals (R. 368) and claims 2 and 7 which were cancelled after rejection by the Primary Examiner (R. 320). The claims read as follows:

> "4. A pellet formed of (substantially pure)* soft carbon black particles, the pellet being sufficiently hard to withstand ordinary shipment or handling, but readily breaking down to a fine state of subdivision upon the application of slight pressure (R. 312, 368).
>
> "8. Soft carbon black particles cohering in small masses of substantially uniform size and having smooth outer surfaces (R. 313, 368).
>
> "2. Carbon black in the form of pellets of sponge-like or porous structure (R. 312, 320).
>
> "7. A carbon black pellet formed of soft carbon black, the pellet having sufficient hardness to withstand ordinary shipment or handling without dusting, but sufficiently fragile to permit reduction to the original fine state of subdivision upon the application of light pressure" (R. 312, 368).

Examination of these claims discloses that they are all broader in scope than present claims 1 and 2 of the patent in suit.

The Board of Appeals said with reference to claims 4 and 8 (R. 360):

> "We believe that a product as broadly stated as by these claims may result from methods far afield from that disclosed by appellants and not in any way suggested by them. These claims are so broad that the product might be quite different from ap-

* Inserted by amendment; R. 328.

pellants'. We do not consider, therefore, that claims 4 and 8 properly define appellants' invention."

The Board of Appeals was clearly correct. Claim 4 covers any pellet which will hold together during handling yet disperse readily under slight pressure. This is a simple definition of the end pursued by Wiegand and Venuto and fails to define the physical structure by means of which that end is attained. Consequently the claim covers any product which attains the end even if the means invented by Wiegand and Venuto were not present. Similarly claim 8 omits the limitation to porosity and in addition fails to call for a pure aggregate and consequently covers an aggregate held together by a binder.

Claims 2 and 7 are also broader in scope than present claims 1 and 2, claim 2 covering aggregates in which a binder may be present and claim 7 having the same all-embracing scope as claim 4.

It thus appears that the claims of the patent in suit, as they stand, are of narrower scope than the claims cancelled while the patent was pending and are limited to the invention actually made instead of extending to something beyond that as the Board of Appeals said. The patentees are making no effort to recapture what they willingly surrendered and the rule of estoppel invoked by petitioners does not apply.

Since there is no reason for narrowing the scope of the claims in suit artificially, and since the petitioners' Sayre pellets fall directly within their terms, infringement is made out.

## Conclusion

Petitioners have expressed concern that if this Wiegand and Venuto patent were sustained the carbon black and rubber industries would suffer by reason of the patented monopoly. To some appreciable extent, this expression of concern may have developed from their misconception of the scope of the patented invention on which we have commented in the foregoing (*supra*, p. 24-29). As to what remains of their concern after correction for that misconception, we suggest that there is no occasion for concern by the rubber industry lest the supply of pelleted carbon black be curtailed, or by the carbon black industry lest its freedom to manufacture and sell the patented carbon black be restricted. Respondent has already granted one license under its patent to a manufacturer of carbon black (R. 42, 61, 210) and has recorded in this case its willingness to grant licenses to all others (R. 42). Thus the only issue here is whether the patent in suit is entitled to recognition in the form of compensation for the use of the patented invention, in accordance with established principles of our patent system whose benefits are sought continuously by all members of the rubber and carbon black industries including these petitioners (R. 268).

In this brief we have endeavored to establish that such recognition is appropriate by reference to the patent, the claims, the prior art and so forth, as is usual in such cases. But we think the appropriateness of the recognition appears equally clearly when the established facts are viewed along broader lines. Apart from all else in the case, the record before the Court makes it clear beyond question that Wiegand and Venuto contributed to the progress of the

useful arts by conferring upon a large section of the people a benefit of such a nature that it affected them most directly, for, aside from the economies in manufacture consequent upon use of that contribution, the rubber workers were freed from the acute discomfort and menace to health involved in spending their working hours in an atmosphere laden with the flying particles of carbon black.

We submit that the Court of Appeals made no error in recognizing the Wiegand and Venuto achievement as a worthy one.

Respectfully submitted,

DEAN S. EDMONDS,
*Attorney for Petitioners.*

WILLIAM H. DAVIS,
ROGER T. MCLEAN,
W. PETERS BLANC,
*Of Counsel.*